WHAT IS CLAIMED IS:

1. An opto-electronic package, comprising:

a substrate;

an optically active device flip-chip bonded to the substrate; and

an integrated circuit bonded to the substrate.

2. The opto-electronic package of claim 1 wherein the optically active device is flip-chip bonded to the the substrate using solder bumps.

3. The opto-electronic package of claim 1 wherein the substrate is selected from the group consisting of a Ball Grid Array substrate, an organic laminate substrate, and a multi-layer ceramic substrate.

4. The opto-electronic package of claim 1 wherein the optically active device is selected from the group consisting of a vertical cavity surface emitting laser (VCSEL), a vertical cavity surface emitting laser (VCSEL) with an attached lens, an array of vertical cavity surface emitting lasers with an attached microlens array, a light emitting diode (LED) with an attached lens, a photodetector with an attached lens, and an optical modulator with an attached lens.

5. The opto-electronic package of claim 1 wherein the integrated circuit is selected from the group consisting of an optical device driver, a transimpedance amplifier, a microprocessor, a microprocessor chip set, a networking integrated circuit, and a memory.

6. The opto-electronic package of claim 1, further including a printed circuit board (PCB) bonded to the substrate.

7. The opto-electronic package of claim 6, wherein the PCB includes a waveguide to propagate light to or from the optically active device.

8. The opto-electronic package of claim 7, wherein the waveguide includes a holographic element to diffract light to or from the optically active device.

9. The opto-electronic package of claim 7, wherein the waveguide includes a sloped facet to reflect light to or from the optically active device.

10. The opto-electronic package of claim 6, wherein the printed circuit board (PCB) is flip-chip bonded to the substrate using solder reflow technology, where solder reflow surface tension pulls the substrate into alignment with the PCB.

11. An opto-electronic package, comprising:

a substrate;

an optically active device with an attached optical element flip-chip bonded to an integrated circuit; and

the integrated circuit bonded to the substrate.

12. The opto-electronic package of claim 11, wherein the substrate is selected from the group consisting of a Ball Grid Array substrate, an organic laminate substrate, and a multi-layer ceramic substrate.

13. The opto-electronic package of claim 11, wherein the optically active device with an attached optical element is selected from the group consisting of a vertical cavity surface emitting laser (VCSEL) with an attached lens, an array of vertical cavity surface emitting lasers with an attached microlens array, a light emitting diode (LED) with an attached lens, a photodetector with an attached lens, and an optical modulator with an attached lens.

14. The opto-electronic package of claim 11, wherein the optically active device with an attached optical element is flip-chip bonded to the integrated circuit using solder bumps.

15. The opto-electronic package of claim 11, wherein the integrated circuit is selected from the group consisting of an optical device driver, a transimpedance amplifier, a microprocessor, a microprocessor chip set, a networking integrated circuit, and a memory.

16. The opto-electronic package of claim 11, further including a printed circuit board (PCB) bonded to the substrate.

17. The opto-electronic package of claim 16, wherein the PCB includes a waveguide to propagate light to or from the optically active device.

18. The opto-electronic package of claim 17, wherein the waveguide includes a holographic element to diffract light to or from the optically active device.

19. The opto-electronic package of claim 17, wherein the waveguide includes a sloped facet to reflect light to or from the optically active device.

20. The opto-electronic package of claim 16, wherein the printed circuit board (PCB) is flip-chip bonded to the substrate using solder reflow technology, where solder reflow surface tension pulls the substrate into alignment with the PCB.

21. A method of optically interconnecting integrated circuits, comprising:

forming a plurality of optical waveguides having a first coupling element and a second coupling element onto a printed circuit board;

electrically coupling opto-electronic transmitters and receivers to integrated circuits, said integrated circuits being bonded to substrates, said substrates being bonded to the printed circuit board, the opto-electronic transmitters and receivers being aligned

correspondingly with the first coupling element and the second coupling element of the plurality of optical waveguides;

modulating light emissions of the opto-electronic transmitters with electrical signals from the integrated circuits to form divergent modulated light emissions;

emitting divergent modulated light emissions;

collimating divergent modulated light emissions of the opto-electronic transmitters using attached lens to form collimated modulated light and directing the collimated modulated light toward the first coupling element;

receiving, by the first coupling element, the collimated modulated light and forming propagating modulated light;

transporting the propagating modulated light from the first coupling element through the optical waveguides to the second coupling element;

directing the propagating modulated light from the second coupling element toward the corresponding lens attached to the opto-electronic receivers to form modulated light emissions; and

transducing, by the opto-electronic receivers, the modulated light emissions into electrical signals for the integrated circuits.

22. The method of claim 21, wherein electrically coupling the opto-electronic transmitters and receivers to the integrated circuits includes using flip-chip bonded solder bump connection technology.

23. An opto-electronic system to optically interconnect integrated circuits, comprising:

an opto-electronic transmitter having an emitting surface and an interconnect surface, the interconnect surface being bonded to a first integrated circuit, the opto-electronic

transmitter emitting a divergent modulated light beam from the emitting surface through an attached first lens to form a collimated modulated light beam;

a first substrate including a first surface bonded to the first integrated circuit, and a second surface bonded to a printed circuit board;

an optical waveguide in close proximity to the first lens attached to the opto-electronic transmitter, wherein the optical waveguide is formed on the printed circuit board, contains a first coupling element to receive the collimated modulated light beam emitted by the opto-electronic transmitter to form propagating modulated light and to re-direct the propagating modulated light through the optical waveguide, and a second coupling element to re-direct the propagating modulated light out of the optical waveguide to a second lens attached to an opto-electronic receiver and in close proximity with the second coupling element;

a second integrated circuit bonded to the opto-electronic receiver; and

a second substrate including a first surface bonded to the second integrated circuit, and a second surface bonded to the printed circuit board.

24. The opto-electronic system according to claim 23, wherein the first surface of the first substrate is bonded to a second surface of the first integrated circuit and the opto-electronic transmitter is bonded to the second surface of the first integrated circuit, and the second surface of the first substrate is bonded to the printed circuit using flip-chip bonded solder bump connection technology.

25. The opto-electronic system according to claim 23, wherein the first surface of the second substrate is bonded to a second surface of the second integrated circuit and the opto-electronic receiver is bonded to the second surface of the second integrated circuit, and

the second surface of the second substrate is bonded to the printed circuit using flip-chip bonded solder bump connection technology.

26. The opto-electronic system according to claim 23, wherein the opto-electronic transmitter is a Vertical Cavity Surface Emitting Laser (VCSEL).

27. The opto-electronic system according to claim 23, wherein the opto-electronic transmitter is an array of Vertical Cavity Surface Emitting Lasers (VCSEL).

28. The opto-electronic system according to claim 23, wherein the opto-electronic receiver is a photodiode.

29. The opto-electronic system according to claim 23, wherein the first and second substrates are contained within Ball Grid Array (BGA) packages or Land Grid Array (LGA) packages.

30. The opto-electronic system according to claim 23, wherein one or more integrated circuits are bonded to the first and second substrates, and electrically coupled to the opto-electronic transmitter and opto-electronic receiver.

31. The opto-electronic system according to claim 23, wherein the first and second coupling elements include sloped facets or holographic elements formed in the optical waveguide.

32. The opto-electronic system according to claim 31, wherein the holographic elements are formed in the optical waveguide such that holographic elements diffract the modulated light into or out of the optical waveguide.

33. An opto-electronic system to optically interconnect integrated circuits, comprising:

an opto-electronic transmitter having an emitting surface and an interconnect surface, the interconnect surface being bonded to a second surface of a first substrate, the opto-

electronic transmitter emitting a divergent modulated light beam from the emitting surface through an attached first lens to form a collimated modulated light beam;

the first substrate including a first surface bonded to a first integrated circuit, and the second surface bonded to a printed circuit board;

an optical waveguide in close proximity to the first lens attached to the opto-electronic transmitter, wherein the optical waveguide is formed on the printed circuit board, contains a first coupling element to receive the collimated modulated light beam emitted by the opto-electronic transmitter to form propagating modulated light and to re-direct the propagating modulated light through the optical waveguide, and a second coupling element to re-direct the propagating modulated light out of the optical waveguide to a second lens attached to an opto-electronic receiver and in close proximity with the second coupling element;

a second surface of a second substrate bonded to the opto-electronic receiver; and

the second substrate including a first surface bonded to the second integrated circuit, and the second surface bonded to the printed circuit board.

34. The opto-electronic system according to claim 33, wherein the first surface of the first substrate is bonded to the first integrated circuit and the second surface of the first substrate is bonded to the opto-electronic transmitter, and the second surface of the first substrate is bonded to the printed circuit using flip-chip bonded solder bump connection technology.

35. The opto-electronic system according to claim 33, wherein the first surface of the second substrate is bonded to the second integrated circuit and the second surface of the second substrate is bonded to the opto-electronic receiver, and the second surface of the second

substrate is bonded to the printed circuit board, using flip-chip bonded solder bump connection technology.

36. The opto-electronic system according to claim 33, wherein the opto-electronic transmitter is a Vertical Cavity Surface Emitting Laser (VCSEL).

37. The opto-electronic system according to claim 33, wherein the opto-electronic transmitter is an array of Vertical Cavity Surface Emitting Lasers (VCSEL).

38. The opto-electronic system according to claim 33, wherein the opto-electronic receiver is a photodiode.

39. The opto-electronic system according to claim 33, wherein the first and second substrates are contained within Ball Grid Array (BGA) packages or Land Grid Array (LGA) packages.

40. The opto-electronic system according to claim 33, wherein one or more integrated circuits are bonded to the first and second substrates, and electrically coupled to the opto-electronic transmitter and opto-electronic receiver.

41. The opto-electronic system according to claim 33, wherein the first and second coupling elements include sloped facets or holographic elements formed in the optical waveguide.

42. The opto-electronic system according to claim 41, wherein the holographic elements are formed in the optical waveguide such that holographic elements diffract the modulated light into or out of the optical waveguide.